



LIQUID PENETRANT TEST REPORT

P- 15195

CLIENT	DART AEROSPACE	DATE	OCT-6-2010	PAGE	1	OF	1
ATTENTION	LINDA/CHANTEL	ACUREN JOB No.	188-10-0905	TIME	AM	<input checked="" type="checkbox"/>	PM <input type="checkbox"/>
ADDRESS	1270 ABELEEN ST. HAWKESBURY, ON. K6A 1K7	PO/NO No.	12703	WORK LOCATION	HAWKESBURY PLANT		
PROJECT	F.P.I. ON CROSS TUBES	ACCEPTANCE STD.	ASTM 1417	REV./DATE	2005		
ITEM(S) EXAMINED	(5)						

JOB DESCRIPTION	PROCEDURE NO. LT-0002	REV./DATE	-	TECHNIQUE No. LT-642	REV./DATE	-	
PART No.	-			MATERIAL	ALUMINUM	THICKNESS	-
SCOPE	WET FLUORESCENT PENETRANT INSPECTION CARRIED OUT ON 100% EXTERNAL SURFACE						

TEST DETAILS	
METHOD <input checked="" type="checkbox"/> FLUORESCENT <input type="checkbox"/> VISIBLE	<input checked="" type="checkbox"/> WATER WASH <input type="checkbox"/> SOLVENT REMOVABLE <input type="checkbox"/> POST EMULSIFIED
FAMILY BRAND NAS NAFLUX	BLACK LIGHT S/N 16459 <input type="checkbox"/> OUTPUT > 1000 μ W/cm ² <input type="checkbox"/> AMBIENT < 2 fc
PENETRANT 2LG7 MINIMUM DWELL TIME 45 MIN.	LIGHTING EQUIP. <input type="checkbox"/> FLASHLIGHT <input type="checkbox"/> TROUBLELIGHT <input type="checkbox"/> OUTPUT > 100 fc @ SURFACE
PENETRANT REMOVER H2O MINIMUM DRY TIME > 10 MIN.	OTHER LAB. NO.
DEVELOPER SKD52 MINIMUM DWELL TIME 10 MIN.	LIGHT METER S/N 1098866 CAL DUE DATE OCT-19 2010
DEVELOPER TYPE <input checked="" type="checkbox"/> NON AQUEOUS <input type="checkbox"/> AQUEOUS <input type="checkbox"/> DRY	

TEST SURFACE	
SURFACE CONDITION <input type="checkbox"/> AS GROUND <input checked="" type="checkbox"/> AS WELDED <input type="checkbox"/> MACHINED <input type="checkbox"/> SHOT BLASTED <input type="checkbox"/> CLEAN BARE METAL	
SURFACE TEMPERATURE <input type="checkbox"/> < -4°C/ 20°F <input type="checkbox"/> -4°C/ 20°F TO 10°C/ 50°F <input checked="" type="checkbox"/> 10°C/ 50°F TO 52°C/ 125°F <input type="checkbox"/> > 52°C/ 125°F	

RESULTS- (<input type="checkbox"/> METRIC <input checked="" type="checkbox"/> IMPERIAL)	
1 - CROSS TUBE - W.O. 61069 ✓	
1 - CROSS TUBE - W.O. 62144 ✓	
1 - CROSS TUBE - W.O. 62145 ✓	
1 - CROSS TUBE - W.O. 62153 ✓	
1 - CROSS TUBE - W.O. 62154 ✓	
	10/10/00

Scope of Services
The agreement of Acuren Group Inc. to perform services extends only to those services provided for in writing. Under no circumstances shall such services extend beyond the performance of the requested services. It is expressly understood that all descriptions, comments and expressions of opinion reflect the opinions or observations of Acuren Group Inc. based on information and assumptions supplied by the owner/operator and are not intended nor can they be construed as representations or warranties. Acuren Group Inc. is not assuming any responsibilities of the owner/operator and the owner/operator retains complete responsibility for the engineering, manufacture, repair and use decisions as a result of the data or other information provided by Acuren Group Inc. In no event shall Acuren Group Inc.'s liability in respect of the services referred to herein exceed the amount paid for such services.

Standard of Care
In performing the services provided, Acuren Group Inc. uses the degree, care and skill ordinarily exercised under similar circumstances by others performing such services in the same or similar locality. No other warranty, expressed or implied, is made or intended by Acuren Group Inc.

SIGNATURES		DTR #	EG3395
CLIENT REPRESENTATIVE	Matthew Murdoch	REPORT REVIEWED BY:	
TECHNICIAN (SIGNATURE):	Mike Johnston	NAME	INITIALS
NAME (PRINT):	1 st TECHNICIAN	2 nd TECHNICIAN	
CGSB LEVEL	SNT LEVEL	CGSB LEVEL	SNT LEVEL
CGSB REG. No	6606	CGSB REG. No	

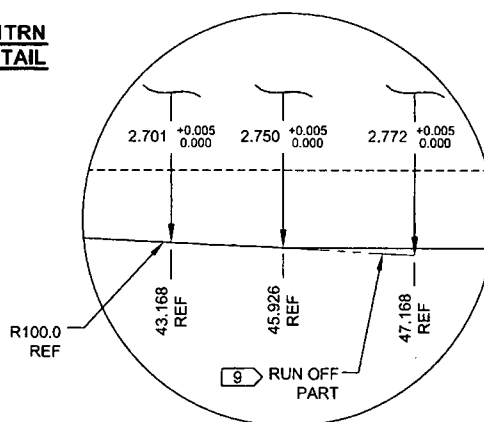
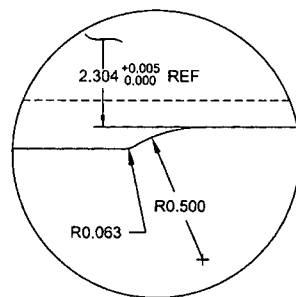
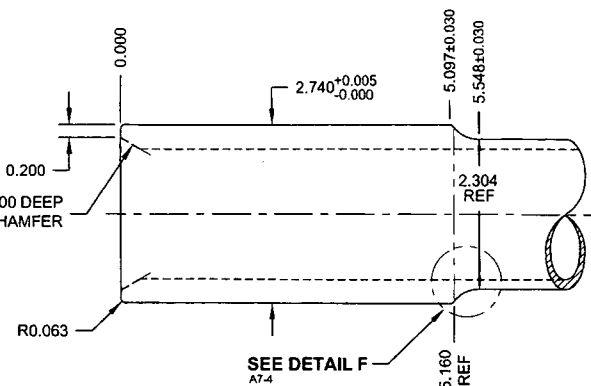
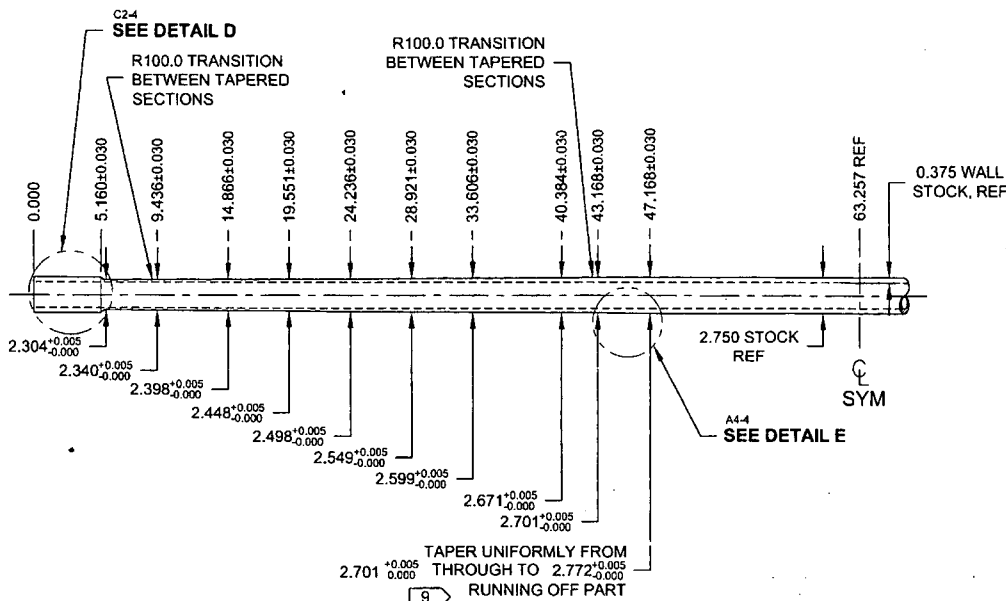
W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries



RELEASED
2009-10-29

DESIGN	PH	DART AEROSPACE LTD	
DRAWN	RF	HAWKESBURY, ONTARIO, CANADA	
CHECKED	97	DRAWING NO.	REV. D
MFG. APPR.	15	D212-664-141	SHEET 4 OF 4
APPROVED	10	TITLE	SCALE
DE APPR.	11	XTUBE ASS'Y (205/212/412 HI FWD)	NTS
DATE	09.09.30	COPYRIGHT © 2000 BY DART AEROSPACE LTD	
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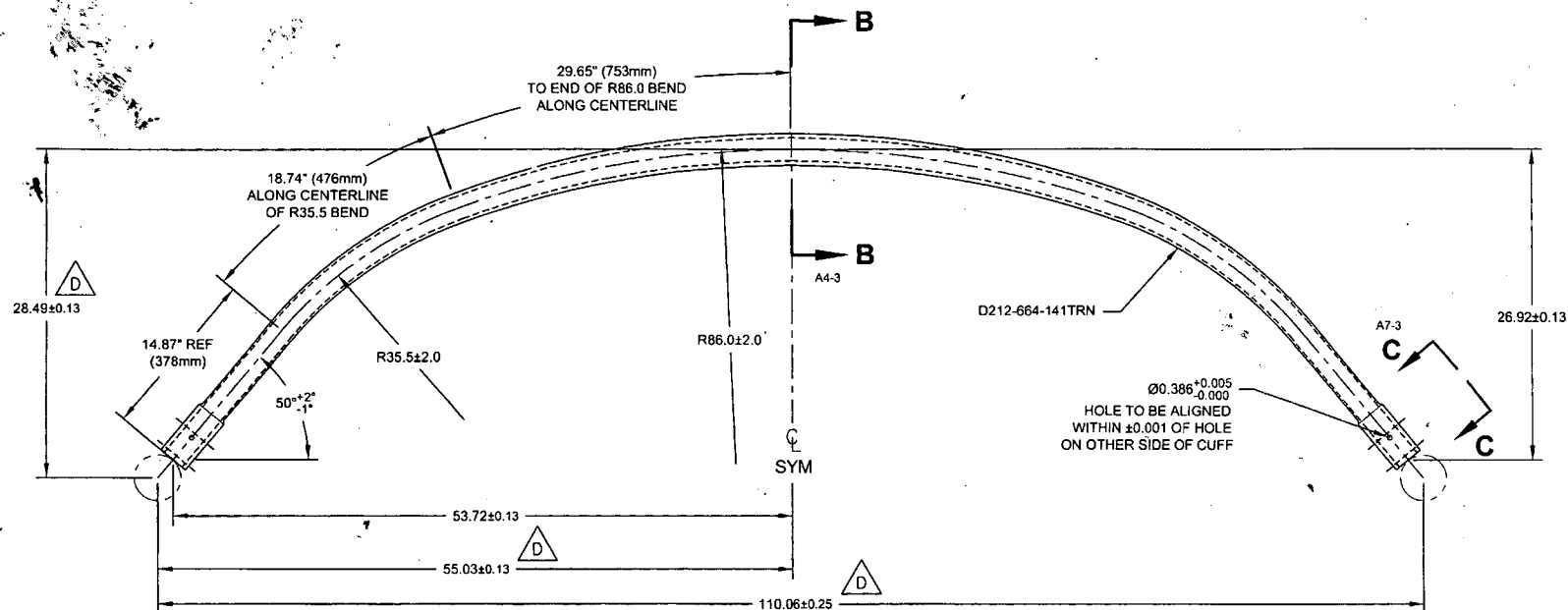
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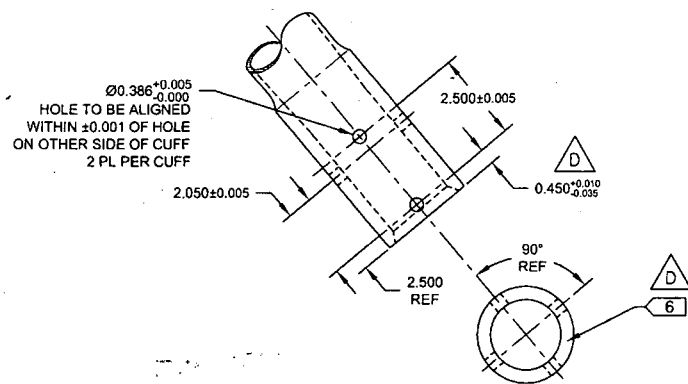
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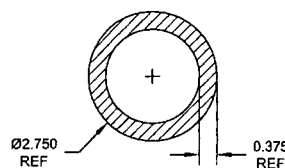


D212-664-501
BENDING AND DRILLING DETAIL

10 D



VIEW C-C: CUFF DETAIL
SCALE 3X



SECTION B-B
SCALE 4X

RELEASED
2009-10-29

DESIGN	PH	DART AEROSPACE LTD
DRAWN	RF	HAWKESBURY, ONTARIO, CANADA
CHECKED	JP	DRAWING NO.
MFG. APPR.	JP	D212-664-141
APPROVED	JP	TITLE
DE APPR.	JP	XTUBE ASSY (205/212/412 HI FWD)
DATE	09.09.30	NTS

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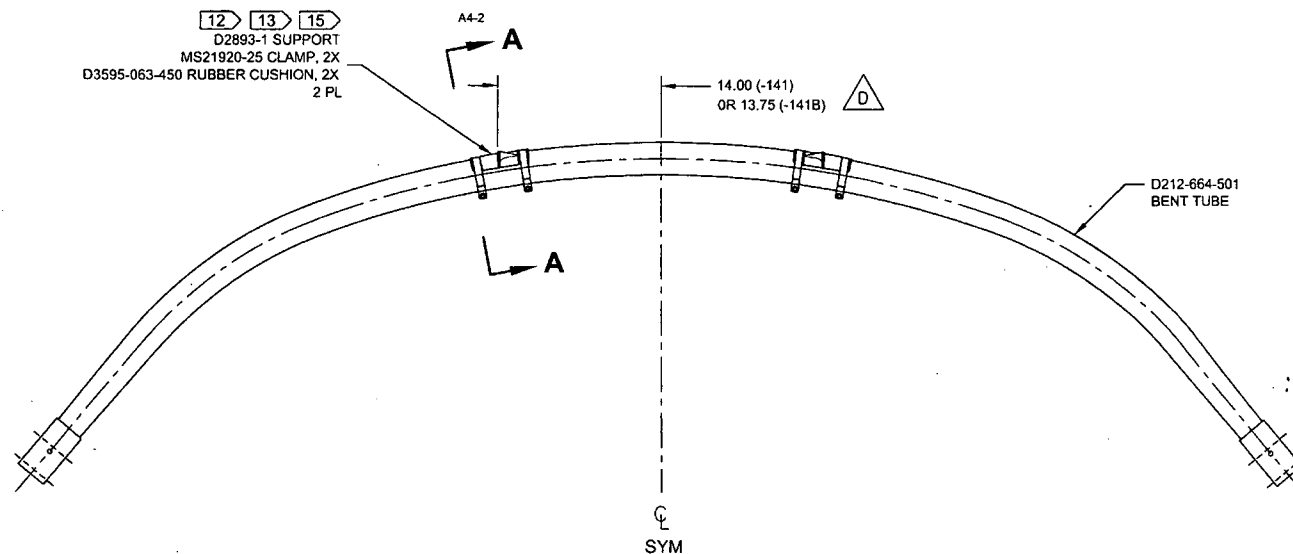
W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

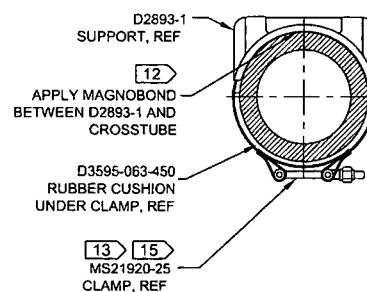
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**D212-664-141/-141B
ASSEMBLY DETAIL**



SECTION A-A D5-2
SCALE 4X

DESIGN	PH	DART AEROSPACE LTD	
DRAWN	RF	HAWKESBURY, ONTARIO, CANADA	
CHECKED	GP	DRAWING NO.	REV. D
MFG. APPR.	DS	D212-664-141	SHEET 2 OF 4
APPROVED	MP	TITLE	SCALE
DE APPR.	HL	XTUBE ASSY (205/212/412 HI FWD)	NTS
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RELEASED
2009-10-29

wb62144

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

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			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

Item	Qty -141	Qty -141B	Part Number	Description
1	X		D212-664-141	CROSSTUBE ASSEMBLY (205/212/412 HIGH FWD)
2		X	D212-664-141B	CROSSTUBE ASSEMBLY (214 HIGH FWD)
3	1	1	D6005-128	CROSSTUBE
4	2	2	D2893-1	SUPPORT
5	4	4	D3595-063-450	RUBBER CUSHION
6	4	4	MS21920-25	CLAMP (OR MS21920-26)
7	A/R	A/R	MAGNOBOND 6398	ROCKWELL SPECIFICATION RBO-120-023 ADHESIVE (TEXTRON/BELL SPEC. 299-947-100, TYPE II, CLASS 2 ADHESIVE)

GENERAL NOTES:

- 1) MATERIAL: MANUFACTURED FROM D6005-128
FINISHED LENGTH = 128.514±0.020
- 2) FINISH: CHEMICAL CONVERSION COAT PER DART QSI 005 4.1
PRIME INSIDE AND OUTSIDE PER DART QSI 005 4.2
PAINT OUTSIDE PER DART QSI 005 4.2
- 3) TOLERANCES ARE PER DART QSI 018 UNLESS OTHERWISE NOTED
- 4) UNITS: INCHES UNLESS OTHERWISE NOTED.
- 5) BREAK SHARP EDGES: 0.005 TO 0.010 MAX.
- 6) IDENTIFICATION: SCRIBE DART PART NUMBER "D212-664-XXX" AND BATCH NUMBER ON INSIDE OF CUFF USING VIBRATING STYLUS
- 7) WEIGHT: D212-664-141 = 33.6 lbs (PER IIN-D212-664)
D212-664-141B = 33.6 lbs (PER IIN-D212-664)
- 8) PART IS SYMMETRIC ABOUT CENTERLINE.
- 9) RUN CUTTER OFF PART. BLEND OUT EDGE LONGITUDINALLY. TRANSITION SHOULD BE SMOOTH.
- 10) BEND PROGRESSIVELY WITH A MINIMUM OF 3 PASSES. MAXIMUM TUBE FLATTENING DUE TO BENDING IS 6% BASED ON O.D.
- 11) LIQUID PENETRANT INSPECT OUTSIDE SURFACE OF CROSSTUBE PER QSI 038.
- 12) INSTALL D2893-1 SUPPORT USING 0.03" TO 0.06" THICK LAYER OF MAGNOBOND 6398 TO THE SURFACE OF D2893-1 THAT WILL BE IN CONTACT WITH THE CROSSTUBE PER QSI 015. LET CURE FOR 12 HOURS AFTER INSTALLATION AND PRIOR TO PACKAGING.
- 13) INSTALL MS21920-25 CLAMPS (OR -26) WITH D3595-063-450 RUBBER CUSHIONS TO SECURE THE D2893-1 SUPPORT ON TOP SIDE OF THE CROSSTUBE. ENSURE CLAMPS ARE OPPOSITE OF CROSSTUBE SUPPORT.
- 14) EXTREME CARE MUST BE TAKEN TO PROTECT THE OUTSIDE SURFACE OF THE TUBE. THE OUTSIDE SURFACE MUST BE SMOOTH AND FREE FROM SURFACE DEFECTS SUCH AS SCRATCHES, NICKS, OR DENTS. DEFECTS UP TO 0.005" MAY BE BLENDED OUT LONGITUDINALLY. CIRCUMFERENTIAL GRIND MARKS ARE UNACCEPTABLE.
- 15) TORQUE CLAMPS 80 TO 100 IN-LB. ENSURE AT LEAST 1.5 THREADS SHOWING IN SAFETY AND THAT NUT HAS NOT BOTTOMED-OUT AFTER TORQUING.

SHOP COPY
RETURN TO
ENGINEERING
UNCONTROLLED
SUBJECT TO
WITH
NO. 62144
B10-916

RELEASED
R 2009-10-29
M

D	REFORMAT/REVISE GENERAL NOTES/PART LIST; REORGANIZED VIEWS AND REFORMATTED DRAWING TO CURRENT STANDARDS; ADD -141B (ZN B4-2, D4-2); REMOVED REF & ADD TOLERANCES (ZN B4-3, C6-3, C8-3 & B6-3); RELOCATED FLAG #6 PER PAR 08-046 (ZN A5-3); MOVED TURNING DETAIL & UPDATED TOLERANCE TO SHEET 4	RF	09.09.30
C	REMOVE -851 ABRASION STRIP; ADD MAGNOBOND 6398, CUSHION, REVERSE CLAMPS	PH	07.03.08
B	ADD HOLES FOR COMPATABILITY WITH BHT/AA SKIDTUBES	PH	05.02.04
A	NEW ISSUE	PH	00.12.12
REV.	DESCRIPTION	BY	DATE
DESIGN	PH	DART AEROSPACE LTD	
DRAWN	RF	HAWKESBURY, ONTARIO, CANADA	
CHECKED	PH	DRAWING NO.	REV. D
MFG. APPR.	PH	D212-664-141	SHEET 1 OF 4
APPROVED	PH	TITLE	SCALE
DE APPR.	PH	XTUBE ASSY (205/212/412 HI FWD)	NTS
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W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

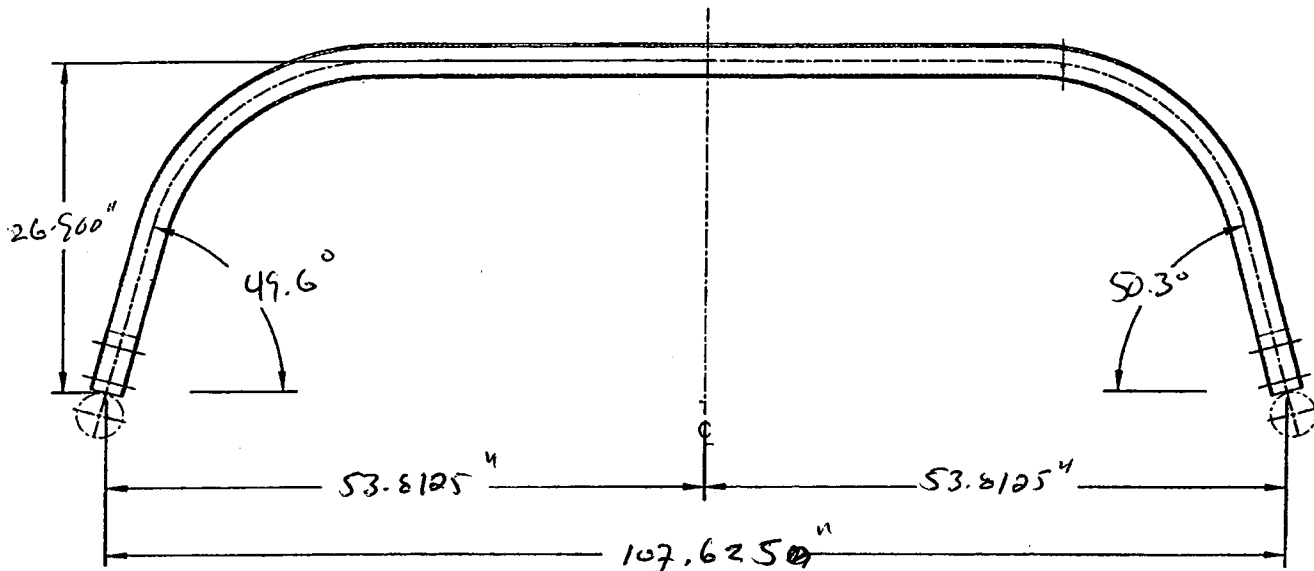
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NOTE: Date & initial all entries

DART AEROSPACE LTD	Work Order:	<i>62144</i>
Description: Crosstube High Fwd (205/212/412)	Part Number:	D212-664-101
Inspection Dwg: D212-664-141	Rev: D	Page 1 of 1

Required Dimension	Min	Max
Height	26.79	27.05
1/2 Span	53.59	53.85
Angle	49	52
Total Span	107.18	107.7



Comments

QC15 Inspection	<i>S</i>
Date	<i>10/01/28</i>

Rev	Date	Change	Revised by	Approved
A	07.02.06	New Issue	KJ/JM	
B	07.05.31	Dimensions updated per Dwg Rev C	KJ/JM	
C	10.04.01	Dwg Rev updated	KJ <i>KA</i>	<i>Z</i>

W/O:		WORK ORDER CHANGES					
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NOTE: Date & initial all entries

Picklist Print

Thursday, September 16, 2010 3:45:59 PM

Page 3

Work Order ID: 62144

Parent Item: D212-664-101

Parent Item Name: Crosstube Fwd

Start Date: 9/16/2010

Required Date: 9/30/2010

Start Qty: 1.00

Required Qty: 1.00

AN6-36A

Purchased

No

240

Each

40.0000

4

4



Bolt

Location

Loc Qty

Loc Code

ST343

40

115016

40

MS21042L6

Purchased

No

240

Each

268.0000

6

6



Nut

Location

Loc Qty

Loc Code

ST300

268

111578

4

114495

64

115300

200

AN960JD616

NAS1149D0663J

Purchased

No

240

Each

0.0000

18

18



Washer

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

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NOTE: Date & initial all entries

Picklist Print

Thursday, September 16, 2010 3:45:59 PM

Work Order ID: 62144



Parent Item: D212-664-101



Parent Item Name: Crosstube Fwd

Start Date: 9/16/2010

Required Date: 9/30/2010

Start Qty: 1.00

Required Qty: 1.00

MS21920-25

Purchased

No

220

Each

79.0000

4

4



Clamp(per MIL-DTL-8783C)



ml 10-10-07

Location

Loc Qty

Loc Code

LG

55

113281

0

114759

5

114901

25

115278

25

ST451

24

113281

5

113282

18

113744

1

D2893-1

Manufactured

No

220

Each

27.0000

2

2



2.75 Support



ml 10-10-07

Location

Loc Qty

Loc Code

LG

27

56354

8

59457

19

Manufactured

No

240

Each

0.0000

1

1

D3428-1



Placard

AN6-35A

Purchased

No

240

Each

31.0000

4

4



BOLT



62096

10/14/13

Location

Loc Qty

Loc Code

ST343

31

115204

31

M115204

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

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Thursday, September 16, 2010 3:45:59 PM

Page 1

Work Order ID: 62144

Parent Item: D212-664-101

Parent Item Name: Crosstube Fwd



Start Date: 9/16/2010

Required Date: 9/30/2010

Start Qty: 1.00

Required Qty: 1.00

Comments: IPP Rev:E 04.02.16 Reformat KJ/DS
IPP Rev:F 06-03-29 Remove Coments on Pick List JLM
IPP Rev:G 07-04-30 As per Rev C JLM

Component Item ID/ Item Name	Replacement Item ID	Mfg/ Purch	Bin Item	Primary Location	Last Location	Route Seq ID	Unit of Measure	Qty on Hand	Qty per Kit	Total Qty	Qty Issued	Date Issued	Status
---------------------------------	------------------------	---------------	-------------	---------------------	------------------	-----------------	--------------------	----------------	-------------	--------------	---------------	----------------	--------

D212-664-101TRN Manufactured No



Crosstube Turning Detail

Location	Loc Qty	Loc Code
LG	2	
61854	1	
61855	1	

① DD 10-9-28

D3595-063-450 Manufactured No



RUBBER CUSHION

Location	Loc Qty	Loc Code
LG	123.6589737	
53775	5.97897368	
58161	3.56	
59580	10.12	
60983	25	
61465	79	

4 4.210526 m/ 10.10.07

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Work Order ID 62144

Thursday, September 16, 2010 3:45:55 PM

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Item ID: D212-664-101

Accept

Setup Start

Revision ID:

Stop

Item Name: Crosstube Fwd

Start Date: 9/16/2010 Start Qty: 1.00

Cust Item ID:

Required Date: 9/30/2010 Req'd Qty: 1.00

Customer:

Reference:

Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____

Run Start

QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Stop

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
--------------------------------	--------------------------	----------------------	---------	--------	--------------	---------------	---------------	------------------	----------------

250

QC4- 100% Inspect kits for completeness

0.00



QC

Memo

0.00

Quality Control

260

Packaging

0.00



Packaging

Memo

0.00

Packaging

Identify and pack for shipping as per PPP D212-664-101

270

QC21- Final Inspection - Work Order Release

0.00



QC

Memo

0.00

Quality Control

8/10/13

REV 12

CA 10/10/12

10/10/13

UMF 10-10-13

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Work Order ID 62144

Thursday, September 16, 2010 3:45:55 PM

Page 6

Item ID: D212-664-101

Accept

Setup Start

Revision ID:

Stop

Item Name: Crosstube Fwd

Start Date: 9/16/2010 Start Qty: 1.00

Cust Item ID:

Required Date: 9/30/2010 Req'd Qty: 1.00

Customer:




Reference:

Run Start

Approvals: Process Plan: Date: Tooling: Date:

Stop

QC: Date: SPC (Y/N): Date:

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
220  Crosstubes	Crosstubes	0.00							
	Memo	0.00							
	1- Lightly scuff the bonded area using a 320 grit sand paper and clean the area with 41058 wash 'n' wipe								
	2-Install supports with magnobond as per QSI 015 Adhere for for 12 Hrs								
	A/R 6398 Magnobond Batch: 114158 exp: 01/2011								
	Torque: M 10/10/08								
230  QC	QC5- Inspect part completeness to step on W/O	0.00							
	Memo	0.00							
	Quality Control								
240  Packaging	Pick Kit	0.00							
	Memo	0.00							
	Packaging								

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

Work Order ID 62144

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Page 5

Item ID: D212-664-101

Accept

Setup Start

Revision ID:

Stop

Item Name: Crosstube Fwd

Start Date: 9/16/2010 Start Qty: 1.00

Cust Item ID:

Required Date: 9/30/2010 Req'd Qty: 1.00

Customer:

Reference:

Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____
QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Run Start

Stop

Sequence ID/
Work Center IDOperation
DescriptionSet Up/
Run Hours

Tool ID

Tool #

Plan
CodeAccept
QtyReject
QtyReject
NumberInsp.
Stamp

200

Spray Painting per QSI005 4.2

0.00



SprayPaint

SprayPaint

Memo

0.00

Spray Painting

1-Prime inside and outside crosstube as per QSI 005 4.2
2-Paint outside crosstube with White Imron as per QSI 005 4.2

PRIME:

Start Time: 9:30Fininsh Time: 10:30

PAINT:

Start Time: 3:00Finish Time: 4:30

ml 10 10 06 (1)

210

QC14- Inspect Spray Paint

0.00



QC

Memo

0.00

Quality Control

Then, Wrap in plastic bag to protect from scratches

ST 10-10-07 (1)

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

Work Order ID 62144

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Page 4

Item ID: D212-664-101

Accept

Setup Start

Revision ID:

Stop

Item Name: Crosstube Fwd

Start Date: 9/16/2010 Start Qty: 1.00

Cust Item ID:

Required Date: 9/30/2010 Req'd Qty: 1.00

Customer:

Reference:

Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____

Run Start

QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Stop

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
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180



Packaging

Receive & Inspect for Damage & Mat'l Certs

0.00

Packaging

Memo

0.00

Packaging

Ensure copy of NDT results attached to work order.

Signature 9/16/10 ①

190



QC

QC5- Inspect part completeness to step on W/O

0.00

Memo

0.00

Quality Control

Inspect for damage & ensure results are as per Dwg D212-664-141

Signature 10 10 06 ①

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

Work Order ID 62144

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Page 3

Item ID: D212-664-101

Accept

Setup Start

Revision ID:

Stop

Item Name: Crosstube Fwd

Start Date: 9/16/2010 Start Qty: 1.00

Cust Item ID:

Required Date: 9/30/2010 Req'd Qty: 1.00

Customer:




Reference:

Run Start

Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____

Stop

QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
150  HandFXtube	Crosstubes Chemical Conversion	0.00				①			
Hand Finishing Crosstubes	Memo Chemical Conversion Coat within 24 hours of bending and drilling	0.00							
160  QC	QC5- Inspect part completeness to step on W/O	0.00							
Quality Control	Memo SAD 10-10-04	0.00							
170  Outsource2	Outsource process - NDT per QSI038 4.1	0.00							
Outsource process - NDT	Memo Liquid Penetrant Inspection as per QSI 038 Issue P/O: 12703 LPI as per ASTM 1417 Level 2 Attach copy of NDT results to work order	0.00							

④

CZ 10/10/06 ①

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

Work Order ID 62144

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Page 2

Item ID: D212-664-101

Accept

Setup Start

Revision ID:

Stop

Item Name: Crosstube Fwd

Start Date: 9/16/2010 Start Qty: 1.00

Cust Item ID:

Required Date: 9/30/2010 Req'd Qty: 1.00

Customer:

Reference:

Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____

Run Start

QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Stop

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
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130

QC15- Crosstube Dimensional Check

0.00

S10/09/28



QC

Memo

0.00

Quality Control

140

Crosstubes

0.00



Crosstubes

Memo

0.00

Crosstubes

1-Drill pilot holes in tube as per Dwg D212-664-141 using drill Jig DT8548 & DT8549, using drill table DT8577, set-up towers in hole #7 as per QSI 10

2-Ream hole to finish-size in tube as per Dwg D212-664-141 using drill Jig DT8548 & DT8549. Check dimensions between holes, both sides on both cuffs, to ensure alignment with saddle holes.

3-Scribe part # and batch # using vibrating stylus as per Dwg D212-664-141

4-Deburr & Inspect for surface damage. Repair damage within limits as per Dwg D212-664-141

SAD 29
10-09-28

EL 10-10-5

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

Work Order ID 62144

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Page 1

Item ID: D212-664-101

Accept



Setup Start

Revision ID:

Stop

Item Name: Crosstube Fwd

Start Date: 9/16/2010 Start Qty: 1.00



Cust Item ID:

Required Date: 9/30/2010 Req'd Qty: 1.00

Customer:

Reference:

Approvals:

Process Plan:

Date: 10-9-14

Tooling:

Date:

Run Start

QC:

Date:

SPC (Y/N):

Date:

Stop

Sequence ID/
Work Center ID

Operation
Description

Set Up/
Run Hours

Tool ID

Tool #

Plan
Code

Accept
Qty

Reject
Qty

Reject
Number

Insp.
Stamp

Draw Nbr

Revision Nbr

D212-664-141

Rev D

100

0.00



DOCUMENT CONTROL

DC

Memo

0.00

Document Control

Photocopy bluefile and create labels as per PPP D212-664-101 CHG003

8 rd 10/13

10-10-12

110

0.00



Pick Kit

Packaging

Packaging

Memo

0.00

Packaging

DP

10-9-28

120

0.00



BENDING MACHINE - CROSSTUBES

CNC Bend 2

Memo

0.00

CNC Alpha 160 Bender

Bend tube as per Dwg D212-664-141 using CNC bender program 212-fw and Folio D212-664-101

DP

10-9-28

B62144